

WHAT IS CLAIMED IS:

1. An optical path simulation CAD system comprising:
- 5 a model creation unit for creating a three-dimensional optical model in which one or more optical components are disposed on an optical path extending from a light source to a final arrival position; and
- 10 an optical axis auto-creation unit for figuring out optical axes indicative of behaviors of beams of light in said three-dimensional optical model on the basis of predetermined set parameters, said optical axis auto-creation unit providing displays of said optical axes in said three-dimensional optical model, for
- 15 verification.
2. A system according to claim 1, wherein
- 20 said optical axis auto-creation unit defines the optical axis diameter and the color of a beam of light emitted from said light source, said optical axis auto-creation unit creating and arranging a cylindrical optical axis model having a length starting from said light source and ending in an input surface of a next adjacent optical component lying on said optical path.
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3. A system according to claim 2, wherein
- said optical axis auto-creation unit varies the

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optical axis diameter of said optical axis model as a function of the distance from the starting point.

4. A system according to claim 1, wherein
5 for said optical component(s) interposed
between said light source and a final arrival position,
said optical axis auto-creation unit creates output-
side optical axis model(s) in conformity with optical
functions of said optical component(s) from input
10 optical axis model(s), to arrange said output-side
optical axis model between said optical component and
a next adjacent optical component or said final arrival
position.

15 5. A system according to claim 4, wherein
in case said optical component lying on said
optical path is a movable reflecting mirror that is
capable of swinging around a predetermined rotational
axis, said optical axis auto-creation unit is able to
20 designate as control parameters the position of said
rotational axis and the angle of a reflection surface
within a three-dimensional space, said optical axis
auto-creation unit automatically creating and arranging
reflected optical axis models from input optical axis
25 models on the basis of said control parameters.

6. A system according to claim 4, wherein

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in case said optical component lying on said optical path is a polygon mirror that has a plurality of mirror faces formed on its periphery and that rotates at a certain angular velocity, said optical axis auto-creation unit previously defines the structures of said plurality of mirror faces, figures out the positions of said mirror faces within a three-dimensional space and the angles of the reflection surfaces from mirror rotational angles, and automatically creates and arranges an optical axis model reflected on a specific mirror face from an input optical axis model.

7. A system according to claim 1, wherein in case said optical component lying on said optical path is a lens, said optical axis auto-creation unit previously defines optical functions of said lens and automatically creates an output-side optical axis model in conformity with said optical functions from an input optical axis model, to arrange said output-side optical axis model between said optical component and a next adjacent optical component or an image forming face.

8. A system according to claim 1, wherein said optical axis auto-creation unit provides a display of an optical axis ending point at a position where an optical axis model intersects said final arrival

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face, said optical axis auto-creation unit recording coordinates of said ending point into a file.

9. A system according to claim 1, wherein
5 said optical axis auto-creation unit defines a boundary wall model indicative of an optical axis extension limit around said three-dimensional optical model, said optical axis auto-creation unit if said optical path has no final arrival position providing an
10 ending point, setting the position of said boundary wall model which said optical axis model intersects as an ending point of an extended optical axis model.

10. A system according to claim 1, wherein
15 said optical axis auto-creation unit previously defines time-sequential variations of control parameters of said optical components lying on said optical path extending from said light source to an image forming face, said optical axis auto-creation unit
20 allowing said three-dimensional model to perform continuous actions in accordance with said time-sequential variations of said control parameters, to thereby display a desired ending point trace in the shape of, e.g., a letter or a symbol on a final arrival face
25 and to record coordinates of said ending point into a file.

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11. A system according to claim 10, wherein
said optical axis auto-creation unit converts
coordinate values of said ending point coordinates
recorded in said file, into dot data, for the output from
5 a printer.

12. An optical path simulation method comprising the
steps of:

creating a three-dimensional optical model in
10 which one or more optical components are disposed on an
optical path extending from a light source to a final
arrival position; and

calculating optical axes indicative of
behaviors of beams of light in said three-dimensional
15 optical model on the basis of predetermined set
parameters, to provide displays of said optical axes in
said three-dimensional optical model, for verification.

13. A method according to claim 12 further comprising
20 the steps of:

defining the optical axis diameter and the color
of a beam of light emitted from said light source; and

creating and arranging a cylindrical optical
axis model having a length starting from said light
25 source and ending in an input surface of a next adjacent
optical component lying on said optical path.

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14. A method according to claim 13 further comprising the step of:

5 varying the optical axis diameter of said optical axis model as a function of the distance from the starting point.

15. A method according to claim 12, further comprising the step of:

10 for said optical component(s) interposed between said light source and a final arrival position, creating output-side optical axis model(s) in conformity with optical functions of said optical component(s) from input optical axis model(s), to
15 arrange said output-side optical axis model between said optical component and a next adjacent optical component or said final arrival position.

16. A method according to claim 15, wherein
20 in case said optical component lying on said optical path is a movable reflecting mirror that is capable of swinging around a predetermined rotational axis, it is possible to designate as control parameters the position of said rotational axis and the angle of a reflection surface within a three-dimensional space
25 so that reflected optical axis models are automatically created, for arrangement, from input optical axis models on the basis of said control parameters.

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17. A method according to claim 15, wherein
in case said optical component lying on said
optical path is a polygon mirror that has a plurality
of mirror faces formed on its periphery and that rotates
5 at a certain angular velocity, the structures of said
plurality of mirror faces are previously defined so that
the positions of said mirror faces within a three-
dimensional space and the angles of the reflection
surfaces are figured out from mirror rotational angles
10 and so that an optical axis model reflected on a specific
mirror face is automatically created, for arrangement,
from an input optical axis model.

18. A method according to claim 12, wherein
15 in case said optical component lying on said
optical path is a lens, optical functions of said lens
are previously defined so that an output-side optical
axis model in conformity with said optical functions is
automatically created from an input optical axis model
20 and is arranged between said optical component and a next
adjacent optical component or an image forming face.

19. A method according to claim 12, further
comprising the steps of:
25 providing a display of an optical axis ending
point at a position where an optical axis model
intersects said final arrival face; and

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recording coordinates of said ending point into
a file.

20. A method according to claim 12, further
5 comprising the steps of:

defining a boundary wall model indicative of an
optical axis extension limit around said three-
dimensional optical model; and

if said optical path has no final arrival
10 position providing an ending point, setting the position
of said boundary wall model which said optical axis model
intersects as an ending point of an extended optical axis
model.

21. A method according to claim 12, further
15 comprising the steps of:

previously defining time-sequential variations
of control parameters of said optical components lying
on said optical path extending from said light source
20 to an image forming face; and

allowing said three-dimensional model to
perform continuous actions in accordance with said
time-sequential variations of said control parameters,
to thereby display a desired ending point trace in the
25 shape of, e.g., a letter or a symbol on an image forming
face and to record coordinates of said ending point into
a file.

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22. A method according to claim 12, further comprising the step of:

~~converting coordinate values of said ending point coordinates recorded in said file, into dot data,~~
5 for the output from a printer.

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